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(54) Abstract Title
A modem having embedded network transmission protocols

(57) A fax/voice high-speed 3-way data transmission modem having embedded network transmission protocols comprises an inbuilt Internet transmission protocol communication module. The module comprises various Internet protocols (such as PPP, TCP/IP, UDP, HTTP, FTP, POP3, SMTP etc) and various Internet application services that support those protocols. The module can connect to computers through an internal line connection or parallel/serial port. The network functions of network connections and desired operations are set out in advance under the support of corresponding BIOS drivers so that the modem is capable of connecting to the Internet automatically and at a set time and without switch-on of a host computer, automatically browsing web sites, receiving and sending emails and faxes and automatically executing network remote monitoring. A wake-up signal can be sent to a host computer, display and peripheral to execute network functions established in advance.
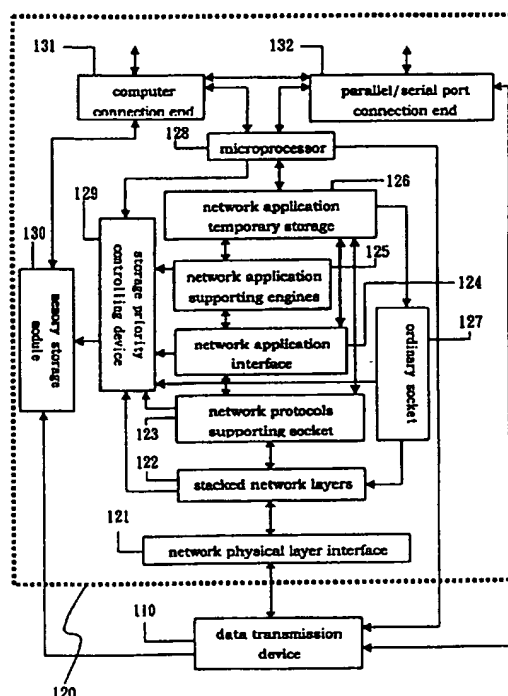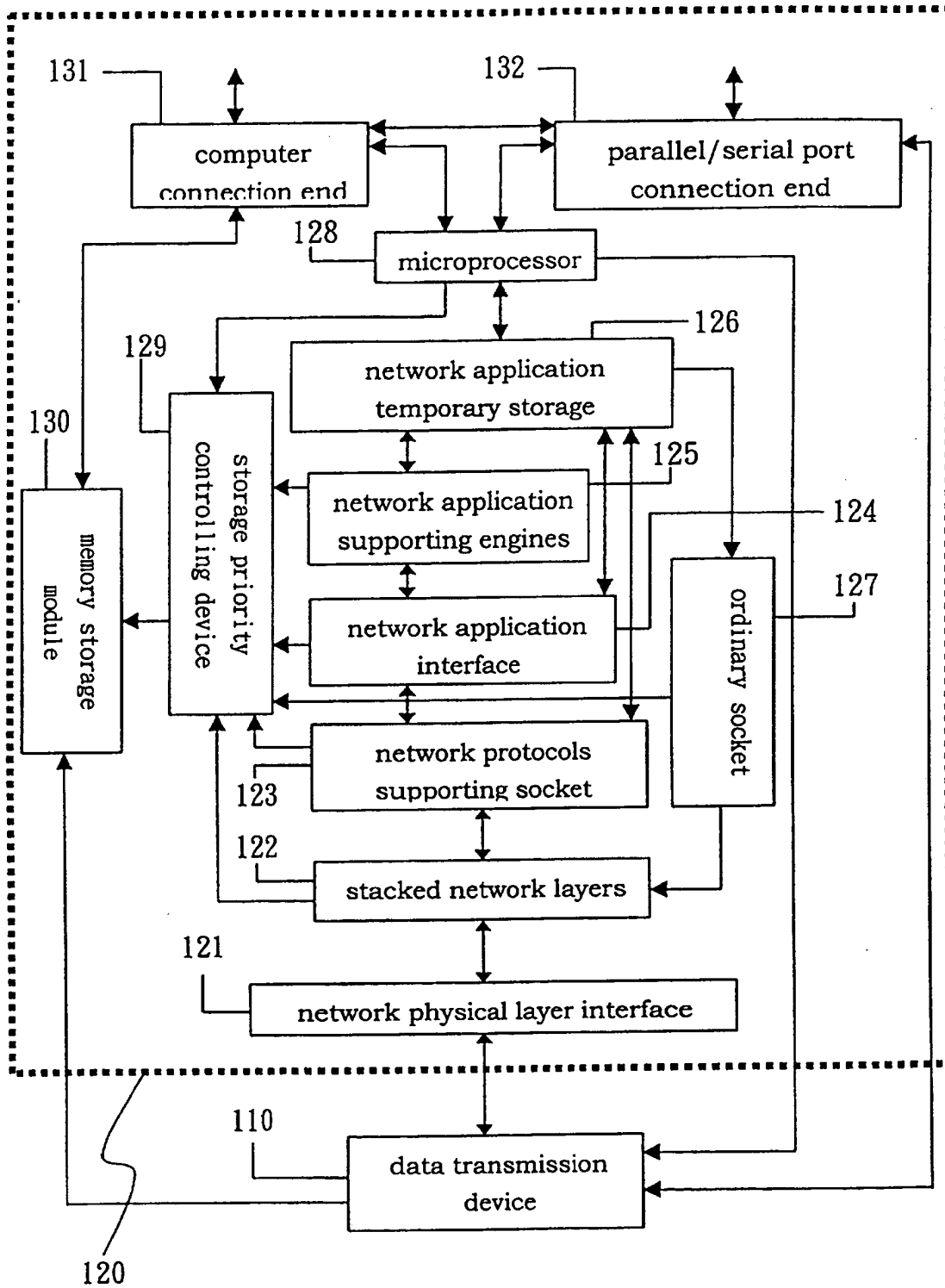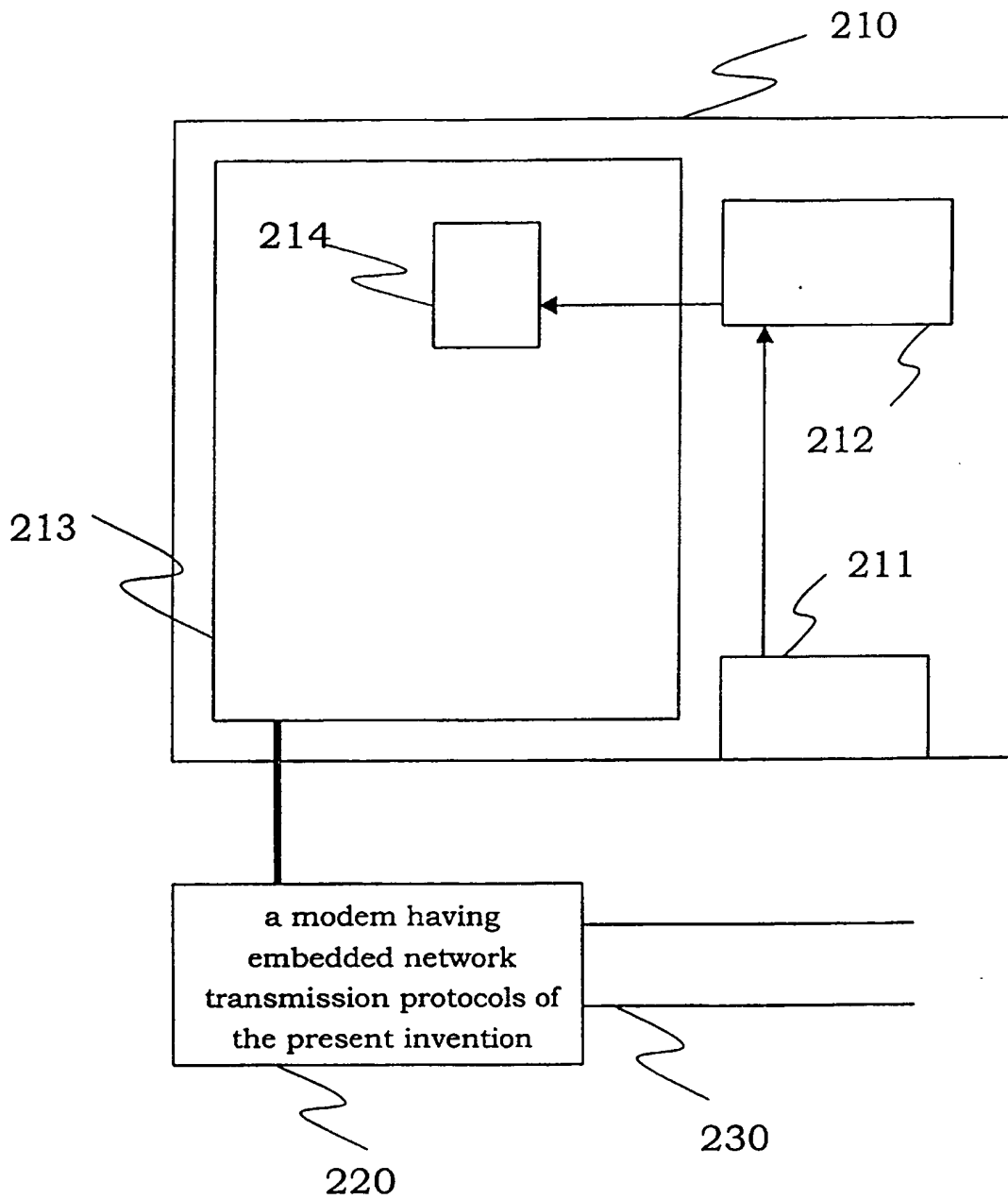
FIG. 1

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131 — computer connection end

132 — parallel/serial port connection end

128 — microprocessor

129

130 — memory storage module

storage priority controlling device

126 — network application temporary storage

125 — network application supporting engines

124 — ordinary socket

127

network application interface

network protocols supporting socket

123

122 — stacked network layers

121 — network physical layer interface

110 — data transmission device

120

FIG. 1

210

214

212

213

211

a modem having
embedded network
transmission protocols of
the present invention

230

220

FIG. 2

310

340

320

340

Industry Control Network

INTERNET

330

340

FIG. 3

start

410 establishing network service functions in advance

420 automatic activating network connection

NO

YES

430 automatic making dial-up connection at a set-time

440 obtaining a limit of authority for login

470 popping out a monitoring interface selection

450 obtaining data through network protocols

480 network remote monitoring

460 leaving network

490 activating computers in an ordinary manner

FIG. 4

start

510

accepting network function
messages from the login
computer's modem

NO

520

YES

activating the login computer
and obtaining network
operating messages

530

displaying the network
operating messages on
a monitor

540
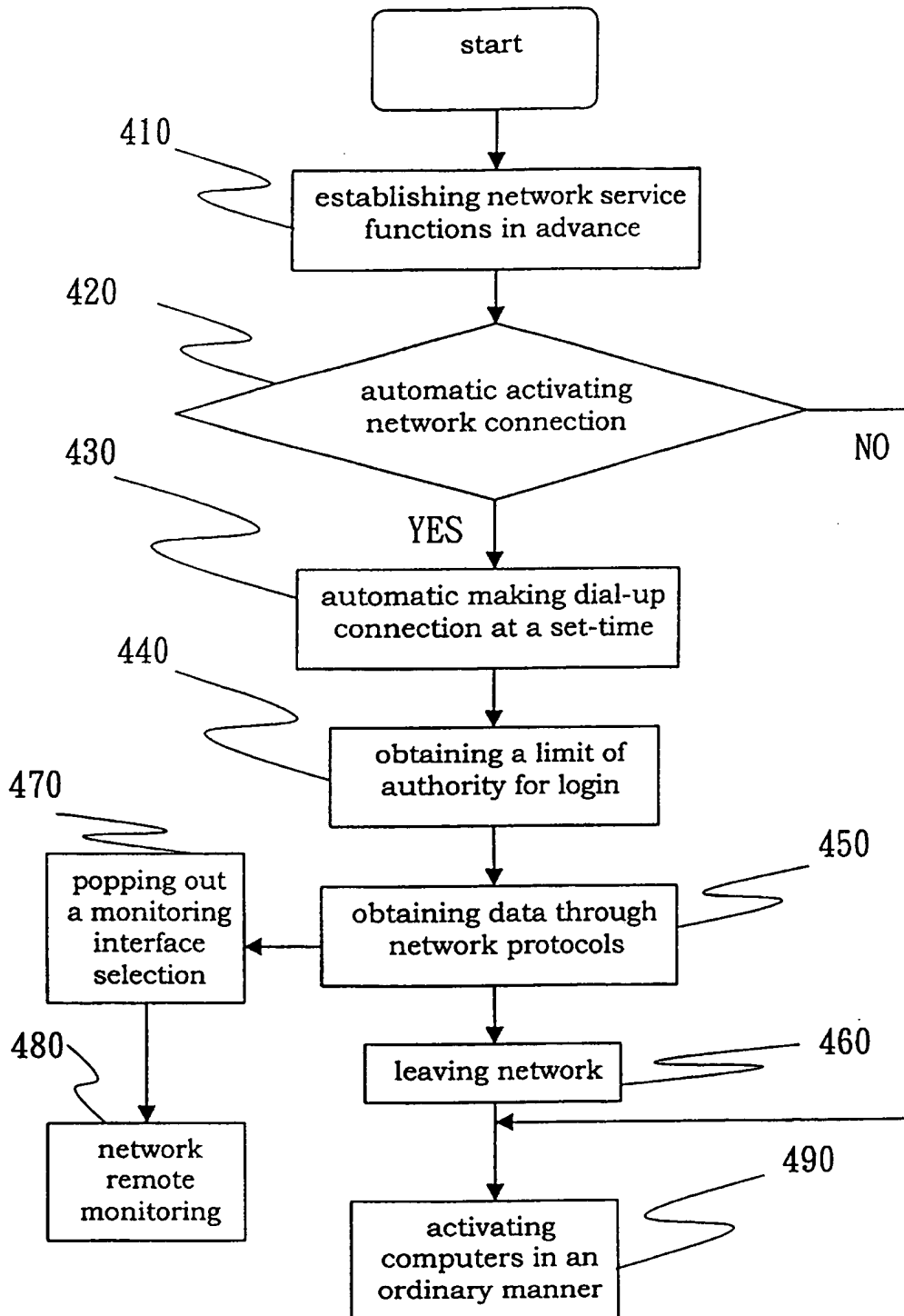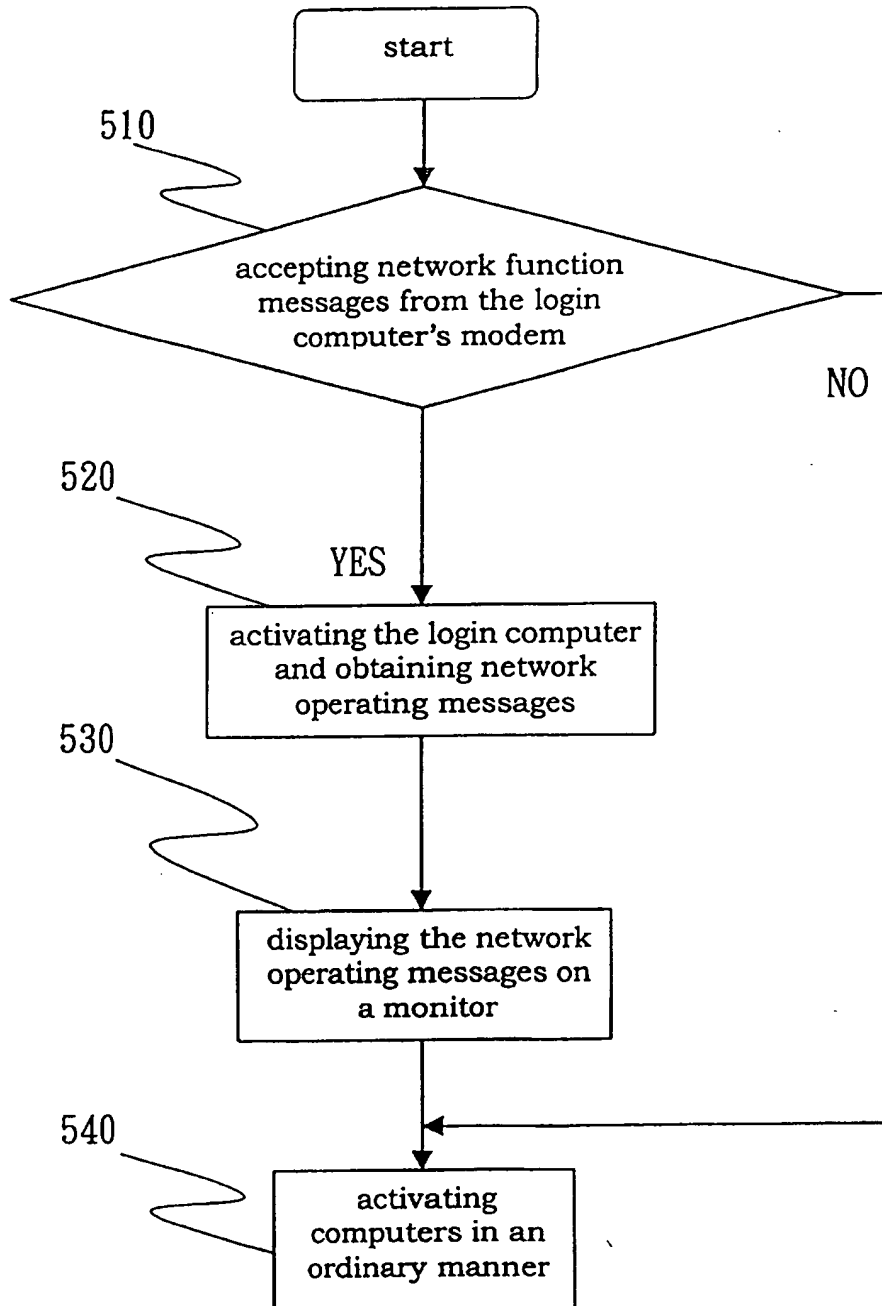
activating
computers in an
ordinary manner

FIG. 5

MODEM HAVING EMBEDDED NETWORK
TRANSMISSION PROTOCOLS

5

The present invention generally relates to a modem, and more .
10 particularly, relates to a modem having embedded network transmission
protocols, which doesn't require any computer for automatic network
connection, and also capable in making computers to connect to the
network automatically at a set-time.

15

In accompanying with popularized applications of Internet protocols
on computers, such as: using HyperText Transfer Protocol (HTTP) and
HyperText Markup Language (HTML) to edit, to browse the Web, and
20 monitor status; using Post Office Protocol version 3 (POP3) and Simple
Mail Transfer Protocol (SMTP) to receive and send Electronic-mails (E-
mails) and to carry out E-mail searching/calling functions; and using
File Transfer Protocol (FTP) to transmit a great quantity of text data file
information, all of the above simply result in a trend of computer
25 replacement by Internet. Although there are devices already been put
out onto the present market, which do not require computer to make
connection to the Internet, their functions still can not replace
computers. Moreover, users of these devices need to dial a number and

enter a name of the corresponding Internet Service Provider's (ISP's) server, that is the IP address, and some even need an Internet account, which make things even more tedious and annoying.

5   Similarly, a drawback still exist for using a computer to connect to Internet, that is, after a modem is connected, TCP/IP, POP3/SMTP, HTTP communication software, etc. must be installed inside the computer through Window95 or Window98 software, in order to get connected to Internet. Normally, computer hardware does not include

10   Internet Protocol. Hence, connecting a computer to Internet directly doesn't mean the computer can use Internet services, where the computer needs to install Internet Protocol software in order to use Internet communication. Users, whom are not familiar with Internet Protocol won't know what to do, and in accompanying with complex

15   operations, the so call "plug and play" will not be achieved. Moreover, as mentioned before, to connect to Internet one needs to dial a number and enter a name of the corresponding ISP's server, and even requires an Internet account. In particularly, for those notebook users, who need to receive/send prompt messages quite often, repeating the above tedious

20   and annoying actions for every single connection, not only time is been wasted, and also unable to make prompt communication, hence result in inconvenience for users.

25   .   .

An object of the present invention is to provide a modem having embedded network communication transmission protocols, which is capable in connecting to Internet automatically and without the

presence of a computer, hence, obtaining convenient network services.

Another object of the present invention is to provide the modem having embedded network communication transmission protocols, which is capable in making automatic time connection to Internet for computers and for obtaining convenient network services. Hence, users no longer need to operate the computer manually and to dial a telephone number for connecting to Internet, that is, by means of the modem having embedded network communication transmission protocols, automatically executing all kinds of network communication transmission protocol software for implementing automation network connection services. Furthermore, capable in achieving various network services of network protocol supports by computers automatically. For example, automatically time browsing World Wide Web sites, automatically time receiving/sending electronic mails, automatic electronic mail time searching/calling, automatically selecting network messages filtration, automatically time downloading messages and data information, automatically executing network remote monitoring, automatically receiving/sending faxes, etc.

In accordance with the above objects, the present invention provides a fax/voice high-speed 3-way data transmission modem having an additional inbuilt Internet transmission protocol communication module. This communication module comprises various Internet protocols, such as, Point-to-Point Protocol (PPP), Transmission Control Protocol/Internet Protocol (TCP/IP), User Datagram Protocol (UDP), HyperText Transfer Protocol (HTTP), File Transfer Protocol (FTP), Post Office Protocol version 3 (POP3), Simple Mail Transfer Protocol (SMTP),

3

etc. The various Internet application services that support those protocols are: World Wide Web browser engine, E-mail engine, remote control engine, network monitoring engine, network receiving/sending fax engine, network voice recording engine, etc.

5

Moreover, the communication module can also connect to computers through either an internal line-connection end or a parallel/serial port. Furthermore, the network functions of network connection and the desired operations are set out in advance under the

10 support of the corresponding BIOS drivers, hence, making the module capable in connecting to the network operations independently. The computers are normally at the shutting down or waiting stage for avoiding power wastage and hence achieving an efficient resource saving. A microprocessor of the present module sets an internal network

15 application temporary storage device, and in the mean while, the network communication service messages of the desired operations can be selectively time stored into an internal memory or a computer's memory automatically. Any signal of the requiring network functions that has been established in advance once is detected, a "wakeup" signal

20 will be send out to detonate the computers and a network displaying facility, and to touch off a computer peripheral facility automatically for executing the network functions established in advance. In the entire system, the only part that requires manual input is the first time according to a network service setting interface to input a dialing phone

25 number, an Internet address and an account of an Internet Service Provider's server, and the desiring network services. These data are then stored into the present communication module and under the guidance of the corresponding supporting software to enter an automatic network

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connection service module.

The foregoing aspects and many of the attendant advantages of this invention will become more readily appreciated as the same becomes better understood by reference to the following detailed description, when taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is a system architectural diagram of a modem having embedded network transmission protocols of the present invention.

FIG. 2 is an illustrative diagram of showing the relationship between the modem having embedded network transmission protocols of the present invention and a computer;

FIG. 3 is an illustrative diagram of showing remote monitor/control against office and factory computers through the modem having embedded network transmission protocols of the present invention;

FIG. 4 is a process flowchart of activating network transmission protocols through the modem having embedded network transmission protocols of the present invention; and

FIG. 5 is a process flowchart of automatic activating network connection of basic input/output systems of office and factory computers through the modem having embedded network transmission protocols of the present invention.

FIG. 1 is in accordance with the system skeleton diagram of a
modem having embedded network protocols that is disclosed by the
present specification. The present high-speed data transmission modem
includes a data transmission device 110, which converts digital signals
to analog signals for the transmitting usage of the telecommunication
network, and converts the analog signals received from the
telecommunication network to digital signals. A protocol module 120
has been added for the specialized usage in network transmissions,
where it takes advantage of data transmission device 110 to
communicate messages and to deliver data information through Internet.
This protocol module comprises the followings: a network physical layer
interface 121; a stacked network layer 122 supporting by network
protocols comprises PPP, TCP/IP, User Datagram Protocol (UDP), etc.; a
supporting network protocol socket 123 comprises HTTP, FTP, POP3,
SMTP, etc.; a network application interface 124 comprises Web interface,
E-mail interface, monitoring interface, etc.; a supporting network
application engine 125 comprises World Wide Web engine, E-mail engine,
remote control engine, network monitoring engine, network
receiving/sending fax engine, network voice recording engine, etc.; a
network application temporary storage device 126; an ordinary line-
connection socket 127; a microprocessor 128; a storage priority
controlling device 129; a memory storage module 130; a host computer
connection end 131; and a parallel/serial port connection end 132.

Next, in the follow up, a more detailed description on the systemic

working principle of a modem having embedded network protocols that is disclosed by the present specification. As we know that, hovering over Internet, a modem is the most fundamental equipment and in order to be able to connect to the network system, the data transmission device 5 110 that has been included inside the modem must have the network physical layer interface 121. The network physical layer interface must also connect to the stacked network layer 122 that comprises Internet Protocol. In accordance with the rules of TCP/IP been included within Internet Protocol, all Internet Service Providers' servers must use the 10 software that is conformed to Internet Protocol rules, in order to send and receive network packet data information. Since PPP and TCP/IP are the most fundamental network transmission protocols, the stacked network layer 122 specially used in the network communication module must to be able to execute TCP/IP. This particular portion is 15 accomplished in the prior art by establishing software that conforms to Internet Protocol and sharing among all application engines. And now, this particular portion of work is been accomplished in the present invention by adding the stacked network layer 122 into the modem, and in supporting with network communication.

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In addition, data within the network are transmitted by packeting method, the standard format of Internet data packet is based on User Datagram Protocol (UDP), which makes the format of network packet doesn't need to rely on other network techniques. Internet data are 25 placed inside a network packet and been sent out within the network. Once the network packet arrive in next computer or next network facility, the computer will unpacket the packet, extract the data, check for the packet's destination address, and work out how to handle the data. In

order to realize the path selection and the passing on of the data, every single computer that links to the network must assign an Internet address or account where it belongs to. The prior art method often needs to install related Internet software for entering Internet address or

5   account. However, the method for automatic network connection of the present invention only require to enter and store Internet address or account into the present modem once through computer or other network facility. The network protocol module 120 will automatically accomplish the network connection job that follows.

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Moreover, on this fundamental TCP/IP, as what is shown in FIG. 1, the network protocol module 120 further established the supporting network protocol socket 123, the network application interface 124, and the supporting network application engine 125 for establishing network

15   functions in advance. For example: HyperText Transfer Protocol (HTTP) and File Transfer Protocol (FTP) of the World Wide Web engine and the remote control engine; Post Office Protocol version 3 (POP3) and Simple Mail Transfer Protocol (SMTP) of the E-mail supporting engine and the fax/voice engine. Furthermore, these network application interfaces and

20   engines can be established through the network application temporary storage device 126 inside the module. The network application temporary storage device 126 can also transmit data to the stacked network layer 122 and/or to the storage priority controlling device 129 through the ordinary line-connection socket 127. The storage priority

25   controlling device 129 decide the priority sequence of storing the data information from the stacked network layer, the supporting network protocol socket, the network application interface, the supporting network application engine, the ordinary line-connection socket, and the

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microprocessor 128 to the memory storage module 130.

When a corresponding application engine is on duty, the temporal messages and data information that are required can be firstly stored into the memory storage module 130 within the module through the storage priority controlling device 129. Once the microprocessor 128 detected an insufficient capacity within the memory storage module 130, it will send out an "wakeup signal" and detonate the host computer and/or other storage mediums, and also detonate the corresponding software for downloading to computer storage and display. Apart from it, the microprocessor 128 is also used to manage the connection job between the present module and the network during the shutdown of the host computer and/or other network connection facilities. It monitors the original inbuilt data transmission device 110, and at the same time, communicating with the computer and/or other network connection facilities. Moreover, the microprocessor 128 set out the working method of connecting the computer to the network, and the network functions of the modem under the support of the corresponding BIOS software. Beyond all questions, all of the works above only require one establishment by the computer keyboard, which includes the inputting task for Internet address and/or account, and for connection telephone number. As a result of this, the modem having embedded network protocols of the present invention can connect to the network independently at a set time, which doesn't need to turn on the host computer or any other network connection facilities. Power wasting can be avoided and hence achieving an efficient resource saving. Once more, when the microprocessor 128 of the present module 120 detects any signal of the requiring network functions that has been established in

advance, it will follow the automatic guidance of a corresponding software and connect through the host computer connection end 131 and/or the parallel/serial port connection end 132 to "wakeup" the host computer and/or the network displaying facilities in order to display the

5 requiring network function messages. The microprocessor 128 might also detonate peripheral equipment and hence carrying out the network monitoring function. Naturally, in executing the above functions need to be supported by BIOS software, thus bring in a greater conveniency to users.

10

FIG. 2 shows a diagram of a connection between a modem 220 having embedded network protocols of the present invention and a computer 210. The interior components of the computer 210 mainly comprise a power switch 211, a power supply 212, a motherboard 213, a

15 microprocessor 214, etc., and the modem of the present invention connect to the network by a phone line 230. That is, the computer is "offline" ordinarily and can be time connected to the network, where the service jobs of network connection are accomplished by the modem of the present invention automatically. Hence, network data message

20 transmission and/or remote control are performed. The modem of the present invention can also connect to other network facilities.

FIG. 3 shows a manner of remote monitor/control office and factory computers through the modem having embedded network protocols of

25 the present invention. In accompanying with the popularization of computer, the working manner tends to become more elastic, one can use a home computer to operate and control remote office and factory computers. Moreover, there is no need to turn on the computer for

getting an automatic display of the requiring network services. All of the above execution can be achieved by installing the modem of the present invention. It is simply because the modem of the present invention comprises PPP, TCP/IP, FTP, HTTP, etc., hence capable in carrying out

5   remote data transmission and monitoring against factory's operating conditions. In accordance with what is shown in FIG. 3, all computers are installed with a modem of the present invention. Computer 310 is an office computer used in remote data transmission. Computer 320 is a factory computer, which brings monitoring into practice. Computer 330

10   is a household computer. When working a home, the office computer 310 and the factory computer 320 are the only advance established network connection by a modem of the present invention. The requiring network remote control functions and file transmission function are also established in advance for the conveniency of transferring back the office

15   computer's messages and the factory computer's monitoring data. At the same time, establishing the IP address of the household notebook 330, the office computer 310, and the factory computer 320 in advance and storing into the modem. In supporting by corresponding software, automatically enters to the office computer 310 and the factory

20   computer 320 at a set time.

The operating flowchart of the above is shown in FIG. 4. First of all, user turns on the computer and establishes corresponding network services 410, such as, remote monitoring, file transferring back, as well

25   as the corresponding IP address for the computer. Then, one can choose whether to turn on the computer by time activation 420 for displaying a message monitoring homepage and gaining information. Sequentially, automatic connection to the network and receiving limits of authority for

login to the computer 440. Once success in login to the computer, the computer been login will be automatically turned on for network connection. Under the support of the corresponding BIOS software, the corresponding network protocols will be automatically activated for receiving information 450, after then, get off the network 460 or send out controlling messages to pop out a monitoring interface selection 470 for carrying out network remote control 480. If the automatic time connecting network is not needed, the computer can still be turned on by the usual manners 490.

FIG. 5 is used for explaining the operating flowchart of network connection by BIOS automatic activation. When a modem of the desired login computer accepted and downloaded the advance established network function messages 510, a "warning" signal will be generated. The microprocessor 128 of the network protocol module 120 will send out a controlling signal to activate the computer 520. Moreover, the computer will automatically activate the advance established network functions by BIOS for receiving network's operating messages from the modem, and displaying the messages on the computer monitor 530. In the mean while, under the support of BIOS corresponding software and network protocols, the information of the office computer 310 and/or the messages of the factory monitoring computer 320 can then be transferred back to the household computer 330 by using a certain interface. Therefore, back transmission and monitoring of network remote information can be realized, otherwise activating computers by the usual method 540.

Although specific embodiments have been illustrated and

described, it will be obvious to those skilled in the art that various modifications may be made without departing from what is intended to be limited solely by the appended claims.

CLAIMS

What is claimed is:

1. A modem having embedded network transmission protocols, said
5   modem comprising:

data transmission means, which converts digital signals to analog signals for the transmitting usage of telecommunication network, and converts the analog signals received from telecommunication network to digital signals; and

10   a network transmission protocol module, which takes advantage of said data transmission means to communicate messages and to deliver data information through Internet.

2. The modem in accordance with Claim 1 only require to enter and store Internet address or account into said modem once through a
15   network connection facility, said network transmission protocol module will automatically accomplish the job of network connection that follows and in future use.

3. The modem in accordance with Claim 1, wherein said network transmission protocol module further comprises:

20   a network physical layer interface, which takes advantage of said data transmission means for connecting network system;

a stacked network layer, which connects to said network physical layer interface, and supports by internet protocol and internet data packet protocol for sending and receiving network packet data
25   information, as well as supporting network communication protocol;

a supporting network protocol socket, which connects to said stacked network layer;

a network application interface, which connects to said supporting

network protocol socket;

a supporting network application engine, which connects to said network application interface, and in cooperating with said supporting network protocol socket and said network application interface for executing network functions established in advance;

network application temporary storage means, which uses to establish said supporting network protocol socket, said network application interface, and said supporting network application engine for executing said network functions established in advance;

an ordinary line-connection socket, which can transmit data information from said network application temporary storage means to said stacked network layer;

a microprocessor is used to "wakeup" a computer and a network displaying facility, and to touch off a computer peripheral facility automatically once a signal of said network functions established in advance is been detected for executing said network functions established in advance;

storage priority controlling means, which decides a priority sequence of storing data information from said stacked network layer, said supporting network protocol socket, said network application interface, said supporting network application engine, said ordinary line-connection socket, and said microprocessor;

a memory storage module, which takes advantage of said storage priority controlling means to decide said priority sequence for storing data information;

a computer connection end is used for the purpose of transmitting data information with a connected computer; and

a parallel/serial port connection end is used for the purpose of

transmitting data information with a network connection facility.

4. The modem in accordance with Claim 3, wherein said stacked network layer further comprises transmission control protocol/internet protocol.

5. The modem in accordance with Claim 3, wherein said stacked network layer further comprises user datagram protocol.

6. The modem in accordance with Claim 3, wherein said stacked network layer further comprises point-to-point protocol.

7. The modem in accordance with Claim 3, wherein said supporting network protocol socket further comprises hypertext transfer protocol.

8. The modem in accordance with Claim 3, wherein said supporting network protocol socket further comprises file transfer protocol.

9. The modem in accordance with Claim 3, wherein said supporting network protocol socket further comprises post office protocol.

10. The modem in accordance with Claim 3, wherein said supporting network protocol socket further comprises simple mail transfer protocol.

11. The modem in accordance with Claim 3, wherein said network application interface further comprises world wide web interface.

12. The modem in accordance with Claim 3, wherein said network application interface further comprises electronic mail interface.

13. The modem in accordance with Claim 3, wherein said network application interface further comprises monitoring interface.

14. The modem in accordance with Claim 3, wherein said supporting network application engine further comprises world wide web engine.

15. The modem in accordance with Claim 3, wherein said supporting network application engine further comprises electronic mail

engine.

16. The modem in accordance with Claim 3, wherein said supporting network application engine further comprises remote control engine.

5 17. The modem in accordance with Claim 3, wherein said supporting network application engine further comprises network monitoring engine.

18. The modem in accordance with Claim 3, wherein said supporting network application engine further comprises network sending/receiving fax engine.

19. The modem in accordance with Claim 3, wherein said supporting network application engine further comprises network voice recording engine.

20. The modem in accordance with Claim 3, wherein said supporting network application engine is on duty, the temporal messages and data information that are required can be firstly stored into said memory storage module through said storage priority controlling means.

21. The modem in accordance with Claim 3, wherein said microprocessor detects an insufficient capacity within said memory storage module, it will send out an "wakeup signal" and detonate an external storage media for downloading into said external storage media.

22. The modem in accordance with Claim 3, wherein when said microprocessor is used to shutdown said network connection facility, said microprocessor can also managing the job of network connection for said network transmission protocol module, monitoring against said data transmission device, and communicating with said network connection facility.

23. The modem in accordance with Claim 3, wherein said microprocessor sets out a working method for connecting to said network connection facility, sets out said network functions established in advance for said modem all under the support of a basic input/output system software, beyond all questions, all of the works above only require one establishment, which includes internet address, account, and a connection telephone number, as a result of this, said modem can connect to internet independently at a set time, which does not need to activate said network connection facility.

24. The modem in accordance with Claim 3, wherein said microprocessor detects a signal of said network functions established in advance, it then follows an automatic guidance of a corresponding software and by means of said computer connection end for "wakeup" said computer and said network connection facility automatically.

25. The modem in accordance with Claim 3, wherein said microprocessor detects a signal of said network functions established in advance, it then follows an automatic guidance of a corresponding software and by means of said parallel/serial port connection end for "wakeup" said computer, said network connection facility automatically, and said computer peripheral facility.

26. A process flow for activating network transmission protocol within a modem having embedded network transmission protocols, said process flow comprising the followings:

establishing a requiring network service in advance;

activating a computer at a set-time by said modem;

dialing and connecting to internet automatically at said set-time by said modem;

receiving a limit of authority for login to said computer by said

modem;

obtaining information through said network transmission protocols by said modem; and

popping out a monitoring interface selection for carrying out a network remote control through said network transmission protocols by said modem.

27. The process flow in accordance with Claim 26, wherein the basic input/output system of activating said login to said computer for a network connection process flow comprises the following steps:

accepting a network function message established in advance by said modem of said login computer;

activating said login computer by said modem;

obtaining a network operating message from said modem by said login computer; and

displaying said network operating message at a login computer monitor.

The
**Patent
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Application No: GB 9923581.4	Examiner: Gareth Griffiths
Claims searched: 1-25	Date of search: 24 March 2000

Patents Act 1977
Search Report under Section 17

Databases searched:

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    UK Cl (Ed.R): H4K (KOD5), H4P (PPC, PPEC, PPG)

    Int Cl (Ed.7): H04L 29/06, H04M 11/06

Other: Online Databases: WPI, EPODOC, JAPIO, INSPEC

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X, P	WO99/65219 A1 (IREADY) fig.3, p.3 lines 6-8, p.6 lines 15-20, p10 lines 1-9	1
X	WO97/47127 A1 (ERICSSON) fig.4, p.11 line 32 - p.14 line 34	1, 2

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